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Index numbers of wholesale prices of principal Canadian exports and imports

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INDEX NUMBERS OF WHOLESALE PRICES OF PRINCIPAL CANADIAN EXPORTS AND IMPORTS

Although it is self-evident that price as well as volume affects the value of trade, the full effect price movements of imports and exports have had in recent years is not so generally recognized. The fact that export prices have fallen 15 p.c. more than import prices since 1926 may not alone seem significant, but it assumes a new aspect when related to trade figures. For instance, had the decline in export prices been on a par with that for imports, it is estimated that Canada's favourable trade balance for 1931-32 instead of being 9 millions, would have been in the neighbourhood of 70 million dollars. The difference between these amounts is roughly equal to one-fourth of the estimated amount of interest payments made by Canada to other countries in 1932.

With the object of obtaining more exact information regarding the influence of import and export prices upon trade and upon domestic price levels, the Dominion Bureau of Statistics has calculated annual index numbers of wholesale prices of important imports and exports which cover the period 1913 to date. These are presented here in conjunction with the Bureau's index number of general wholesale prices, both in tabular and graphic form.

Canadian Index Numbers of Wholesale Prices (a) All Commodities, (b) Imports and (c) Exports.

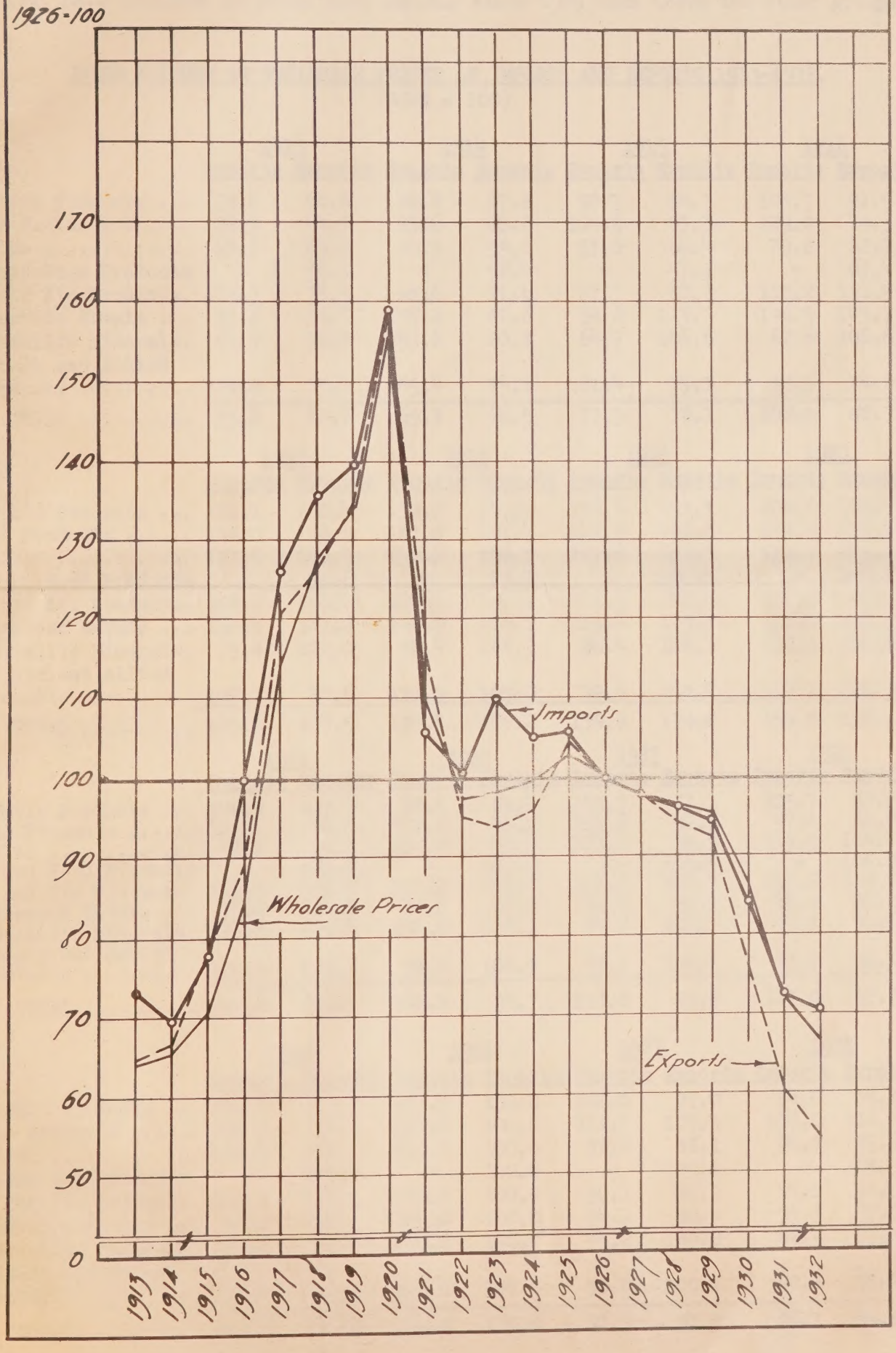
(1926=100)

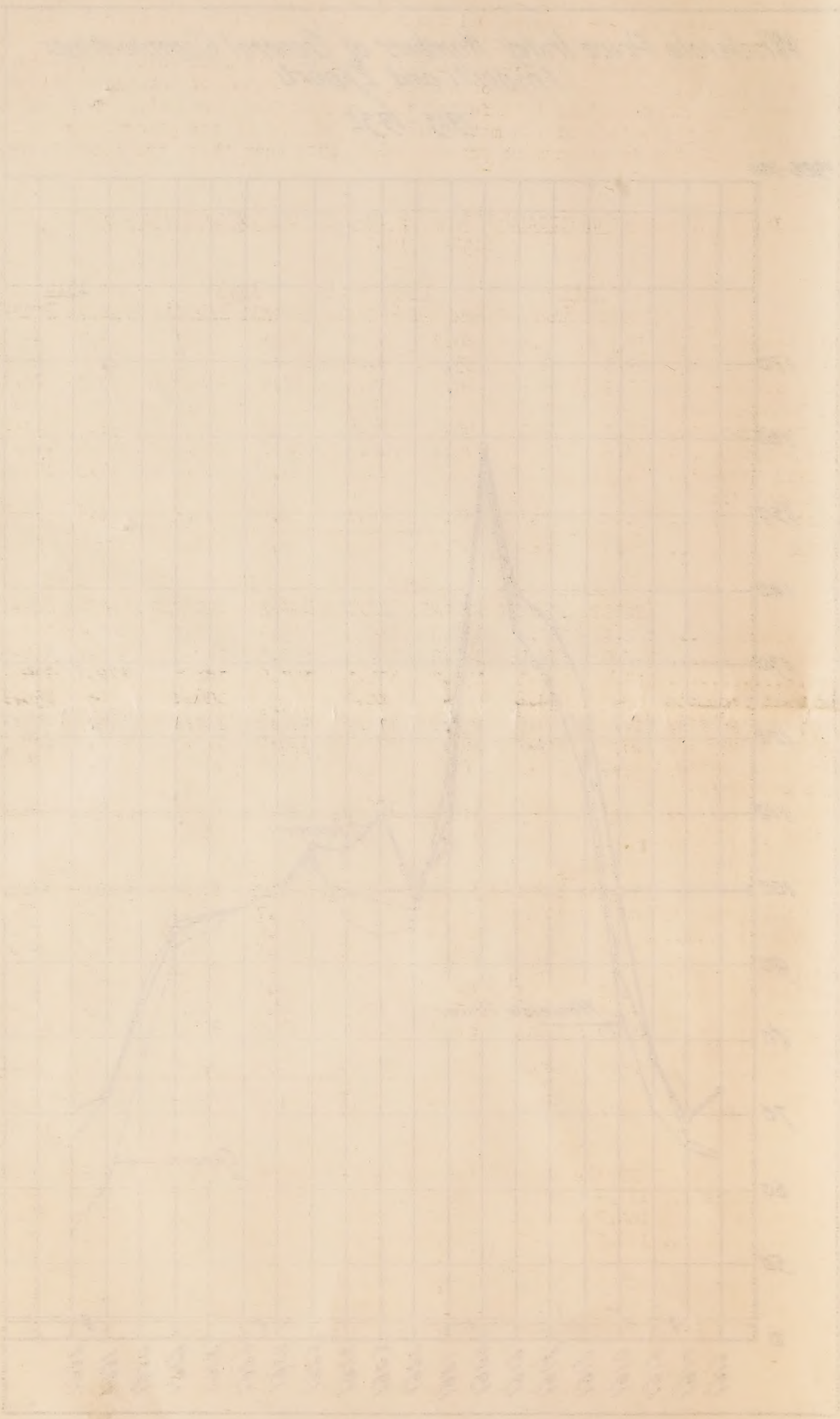
	All Commodities	Imports	Exports
1913	64.0	73.0	64.7
1914	65.5	69.3	66.5
1915	70.4	77.5	78.1
1916	84.3	100.0	88.7
1917	114.3	125.6	120.5
1918	127.4	135.5	126.2
1919	134.0	139.6	134.8
1920	155.9	158.8	158.1
1921	110.0	105.8	116.5
1922	97.3	100.4	94.7
1923	98.0	110.0	93.5
1924	99.4	105.0	95.7
1925	102.6	105.6	104.5
1926	100.0	100.0	100.0
1927	97.7	97.7	97.8
1928	96.4	96.1	94.2
1929	95.6	94.2	92.2
1930	86.6	83.7	77.4
1931	72.1	72.4	60.5
1932	66.7	70.5	54.9

The similarity of movements of the three series since 1913 is apparent at first glance. It has been disturbed in 1914, 1918-19, 1923, and in the years 1930-32, but in each case the reasons for these temporary dissimilarities seem fairly evident. In 1914, grain prices advanced, and carried with them the heavily weighted vegetable products index from 60.6 to 67.8. Other exports tended to move lower in very much the same ratios as import movements. The cause of the more rapid rise of imports relative to exports in the years 1916-18 inclusive can be traced in part to the advance of prices for imported chamicals and non-ferrous metals, which were influenced by war time market conditions and by the depreciated condition of the Canadian dollar. The absence of wood amongst import groups was also a factor since wood exports advanced less decidedly than the average of other export groups between 1913 and 1919. In 1923, large crops sent

Wholesale Price Index Numbers of General Commodities Imports and Exports

1913 - 1932





grain prices downward when the general direction in commodity prices was upward. From 1929 to date a gap has gradually been widening between exports on the one hand and imports and general commodity price levels on the other. Precipitate declines in grain prices during this period have again been a prime factor in drawing these indexes apart. In recent years raw imports have constituted about 25 p.c. and fully and chiefly manufactured imports about 66 p.c. of the total value of all imports. Raw export values have comprised from 38 p.c. to 47 p.c., and fully and chiefly manufactured exports from 38 p.c. to 45 p.c. of the total value of all exports. In times of declining prices it is well known that raw materials fall faster than manufactured products. Thus exports, including a higher percentage of raw materials than imports or the general run of commodities, have declined in price more rapidly since 1929 than these two other groups.

INDEX NUMBERS OF WHOLESALE PRICES OF IMPORTS AND EXPORTS, 1913-1932.
(1926 = 100)

	1913		1914		1915		1916	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Vegetable Products ...	78.0	60.6	80.2	67.8	92.1	84.7	105.7	91.9
Animal Products	92.3	61.3	95.6	60.2	104.9	63.3	129.0	74.3
Textiles	63.3	63.2	60.5	59.6	57.0	66.4	79.8	82.7
Wood and Wood Products	-	58.3	-	58.4	-	57.3	-	63.4
Iron and Its Products.	75.7	73.9	68.6	71.6	77.7	82.7	112.2	111.9
Non-Ferrous Metals ...	93.6	89.0	79.1	82.6	98.2	113.7	146.9	143.7
Non-Metallic Minerals.	61.9	98.7	55.2	80.1	64.7	106.6	67.6	106.6
Chemicals and Allied Products	51.9	75.3	55.4	75.1	61.4	75.1	88.5	74.2
TOTAL	73.0	64.7	69.3	66.5	77.5	78.1	100.0	88.7

	1917		1918		1919		1920	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Vegetable Products ...	122.1	142.4	132.2	145.5	145.6	151.1	200.6	168.2
Animal Products	148.0	94.9	147.0	107.5	212.9	142.8	178.8	136.9
Textiles	117.4	166.3	150.2	196.1	167.6	181.7	172.7	139.7
Wood and Wood Products	-	78.6	-	88.9	-	106.4	-	156.2
Iron and Its Products.	154.6	160.6	152.3	177.9	137.5	148.3	152.1	196.1
Non-Ferrous Metals ...	160.4	141.8	162.9	126.1	115.6	119.3	116.4	129.9
Non-Metallic Minerals.	75.8	122.0	86.4	128.7	96.4	128.3	118.5	152.4
Chemicals and Allied Products	102.7	85.6	116.9	105.6	99.5	108.2	114.1	128.9
TOTAL	125.6	120.5	135.5	126.2	139.6	134.8	158.8	158.1

	1921		1922		1923		1924	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Vegetable Products ...	102.8	109.9	98.4	84.4	113.7	77.1	105.7	88.2
Animal Products	101.4	96.5	102.4	96.5	101.6	92.6	97.1	82.6
Textiles	98.4	95.5	105.7	82.5	127.7	94.9	113.5	104.4
Wood and Wood Products	-	141.6	-	105.9	-	114.2	-	108.9
Iron and Its Products.	116.8	137.9	101.2	110.3	114.2	124.0	113.2	118.8
Non-Ferrous Metals ...	76.8	90.3	79.2	90.2	88.5	92.9	88.2	96.2
Non-Metallic Minerals.	114.0	138.6	104.4	129.1	94.0	101.7	93.8	99.7
Chemicals and Allied Products	105.9	120.6	99.2	106.9	97.1	100.4	95.7	98.1
TOTAL	105.8	116.5	100.4	94.7	110.0	93.5	105.0	95.7

	1925		1926		1927		1928	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Vegetable Products ...	111.9	107.7	100.0	100.0	102.0	97.0	94.0	88.8
Animal Products	108.2	94.7	100.0	100.0	111.7	105.3	132.0	111.3
Textiles	112.9	114.3	100.0	100.0	92.4	88.1	94.7	95.3
Wood and Wood Products	-	103.9	-	100.0	-	99.1	-	98.7
Iron and Its Products.	104.7	107.1	100.0	100.0	98.1	97.4	94.8	91.9
Non-Ferrous Metals ...	96.0	106.1	100.0	100.0	94.7	90.7	99.7	87.5
Non-Metallic Minerals.	95.7	93.4	100.0	100.0	93.2	89.2	88.4	83.8
Chemicals and Allied Products	95.5	98.1	100.0	100.0	98.0	100.7	92.3	98.2
TOTAL	105.6	104.5	100.0	100.0	97.7	97.8	96.1	94.2

INDEX NUMBERS OF WHOLESALE PRICES OF IMPORTS AND EXPORTS, 1913-1932 - Cont'd
(1926 = 100)

	1929		1930		1931		1932	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Vegetable Products	85.6	89.3	75.0	65.3	60.1	41.7	57.6	40.4
Animal Products	113.3	107.9	94.5	94.2	72.5	70.7	59.1	55.7
Textiles	91.4	87.8	75.5	69.5	59.9	56.7	52.6	39.6
Wood and Wood Products.	-	91.9	-	87.3	-	78.3	-	68.1
Iron and Its Products .	95.0	91.3	91.1	87.4	88.7	82.7	91.1	81.3
Non-Ferrous Metals	116.9	88.0	84.7	75.4	57.5	66.2	46.5	65.2
Non-Metallic Minerals .	89.4	83.7	87.3	81.5	80.3	67.8	84.8	66.1
Chemical and Allied Products	92.0	95.6	87.5	92.9	83.3	87.9	86.3	68.3
TOTAL	94.2	92.2	83.7	77.4	72.4	60.5	70.5	54.9

General Wholesale Price Lags

The Bureau's general wholesale price index lagged behind import and export wholesale price indexes from 1913 to 1920 when prices were rising and again from 1929 to 1931 inclusive when prices were falling. The decline in 1921-22 was so precipitate that no similar tendency could be detected at that time. These lags may have been due simply to differences inherent in the indexes which have been constructed to measure group price levels. It is a possibility, for example, that manufactured materials have been more adequately sampled in the general index of commodities than in those for imports and exports, although this seems improbable. Sub-group and group weights in addition to individual commodity weights make it unlikely, and as will be shown later, the price samples for indexes were carefully chosen. A second possibility offering a wide field of investigation is that domestic price influences which characteristically resist change in either direction, have retarded the general movement of commodity prices during both periods. Unfortunately it is extremely difficult to determine what prices are governed primarily by domestic influences.

Price structures form composite units of which each individual item is an integral part. The inter-relation of price forming influences makes impossible the segregation into air tight compartments of commodity groups whose prices are absolutely determined by any given set of factors, and in this sense, there are no purely domestic prices. There is nevertheless a considerable number of commodities either too bulky or too perishable to enter extensively into international trade, e.g., certain fresh fruits, sand and gravel, building stone, etc. Their markets are sometimes more local than national in character, but they do not frequently cross international boundaries.

No inclusive attempt has been made to list such commodities, but a limited group of ten items has been chosen and price comparisons have been made with groups of eighteen exports and twenty-six imports. Care has been taken to choose exports and imports which obviously belong in these categories rather than to make the lists exhaustive. Price index numbers computed from unweighted geometric means and taking 1926 as base, have been calculated and are shown below.

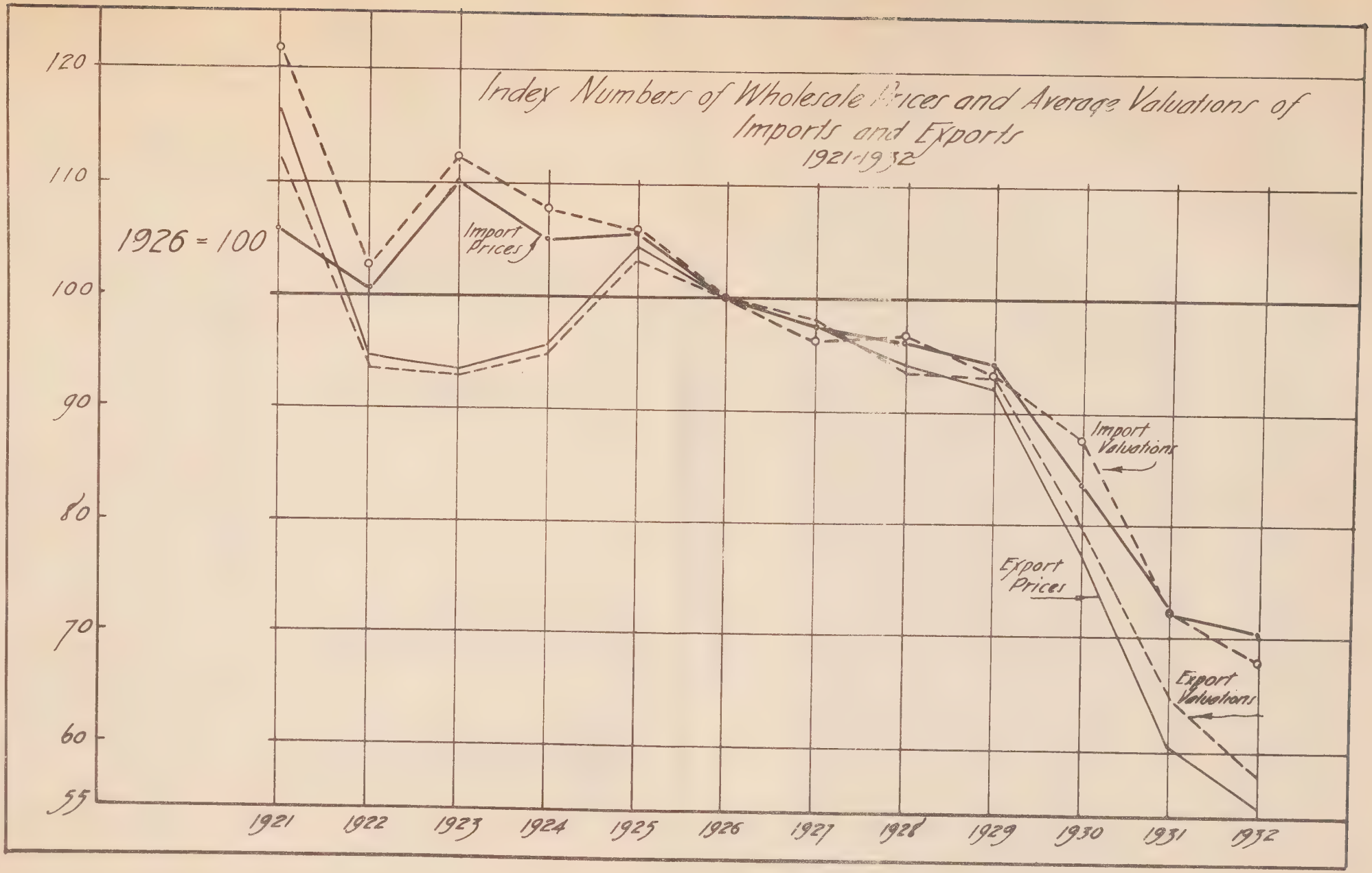
Wholesale Price Index Numbers of Imports, Exports, and Domestic Commodities

	Imports(1) (26 items)	Exports(2) (18 items)	Domestic Commodities(3) (11 items)
1927	97.9	99.0	99.7
1928	92.0	101.6	100.2
1929	90.0	104.4	102.1
1930	75.6	85.6	98.0
1931	63.0	65.7	91.1
1932	65.7	56.3	82.3

(1) Imports - Bananas, lemons, oranges, currants, raisins, prunes, cocoanut oil, olive oil, peanut oil, chinawood oil, rubber, raw; sugar, raw; cocoa beans, green; coffee, green; tea, rice, cleaned; cotton, raw; manila hemp; Mexican sisal; silk, raw; iron ore, tinplate, bauxite ore, tin ingots; coal, anthracite; window glass, crude oil, turpentine.

(2) Exports - Barley, oats, rye, wheat, flour, cod fish, herring, mackerel, salmon, binder twine; wool, raw; paper, fir, pulp, copper, lead, nickel ingots, asbestos.

(3) Domestic - Bread, hay, steers, fowl, milk, brick, quicklime, cement, sand, gravel, crushed stone.


Index Numbers of Wholesale Prices and Average Valuations of Imports and Exports
1921-1932
1926 = 100
120
110
100
90
80
70
60
55
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
Import Prices
Import Valuations
Export Prices
Export Valuations

The indexes would indicate that there was some truth in the hypothesis that domestic price influences checked the rapidity of general price movements. Final conclusions cannot be drawn however, from such limited data.

It is of interest to note that the average of unweighted geometric means points to a less precipitate decline for exports than for imports. The weighted arithmetic aggregative formula reverses the positions of these two indexes, because of the heavy weight attached to the sharp decline in a few basic products such as grains. Likewise in 1932, heavy price declines for important items like sugar and rubber caused a weighted import series to fall, whereas the unweighted geometric index advanced.

Comparisons of Index Numbers of Wholesale Prices and Customs Valuation Averages of Imports and Exports

For some years past the Dominion Bureau of Statistics has calculated index numbers of import and export valuations. The conformity of their movements to those of wholesale price indexes of imports and exports shown above, is closer than might have been expected, since these indexes have been open to the serious criticism that valuation averages take no account of changes in the quality of items from year to year. Customs descriptions are sufficiently broad to include articles not only varying in quality, but in size and weight. Valuation averages are influenced therefore by fluctuations in the value of the average unit of trade rather than price movements alone, but the indexes which follow, give grounds for believing, however, that price changes rather than shifts in quality, size, etc., have been the predominant influence in fluctuations of average valuations since 1913. This is noteworthy for two reasons, first that both sets of index measurements have been made from a fixed base, which should throw into relief such quality changes as occurred, particularly in periods distant from the base year, and second, that the sample of valuation averages is smaller than that used for the wholesale price indexes. This latter fact probably explains the looser relationship between import valuations and prices, since imports do not contain many heavily weighted items which tend to dominate movements of indexes.

Index Numbers of Wholesale Prices and Average Valuations of Imports and Exports
(1926=100)

	Imports		Exports	
	Wholesale Prices	Average Valuations	Wholesale Prices	Average Valuations
1921	105.8	121.8	116.5	112.1
1922	100.4	102.5	94.7	93.7
1923	110.0	112.1	93.5	93.1
1924	105.0	107.8	95.7	95.0
1925	105.6	106.0	104.5	103.2
1926	100.0	100.0	100.0	100.0
1927	97.7	96.4	97.8	98.0
1928	96.1	96.7	94.2	93.6
1929	94.2	93.3	92.2	93.1
1930	83.7	87.4	77.4	79.5
1931	72.4	72.4	60.5	64.8
1932	70.5	68.0	54.9	57.9

Notes on the Construction of Wholesale Price Index Numbers of Imports and Exports

Thexe indexes have been calculated using the year 1926 as the base period. The weights for individual commodities, as well as group and sub-group weights, have been computed from averages of the value of imports and exports in the six year period 1926-1931. Continuous shifts in the relative importance of individual items from year to year made this seem advisable. In order to secure an adequate sample, all items in trade returns, the total declared value of which averaged $500,000 or over, during the period 1926-1931, were at first considered. In occasional instances price series were not available to represent these groups, but it is safe to say that no commodities of major importance have been excluded. By actual test it was found that price series in the index covered over 65 p.c. of the value of exports and 35 p.c. of imports in the years 1926-1931. The greater diversity of imports made it impossible to obtain as complete a coverage as for exports. It should be noted that less adequate price records in earlier years made it necessary to use a somewhat smaller sample of

prices series prior to 1926 than in years subsequent. These series have been spliced at the base year. Prior to 1926, 50 export and 55 import price series have been used, but for the second period 87 export and 95 import series are included. It has not been possible in every case to secure price series quoted at seaports or border cities. For example, grain prices used are Fort William and Port Arthur in storage quotations, and a few lumber prices are upon an f.o.b. mill basis. Admittedly it would be preferable to have border or seaport quotations, but tests made with this type of data, indicate it is better to use slightly inappropriate prices rather than exclude important commodities.

The formula used in computing these indexes is the weighted arithmetic aggregative type of Laspeyres $\frac{\Sigma P_1 Q_o}{\Sigma P_o Q_o}$

where P_o equals the average price in the year 1926.

P_1 equals the average price in the given year.

Q_o equals a weight which when multiplied by the average of the P's for the period 1926-1931, gives the average declared value for these years of the commodity represented by P.